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INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

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C-O-N-F-I-D-E-N-T-I-A-L

50X1-HUM

COUNTRY	Czechoslovakia	REPORT	
SUBJECT	Continuous Casting and Rolling Process for Steel Production	DATE DISTR.	
	Enclosed sketch not included in minicard test collection.	NO. PAGES	7
		REFERENCES	RD
DATE OF INFO.			
PLACE & DATE ACQ.			

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SOURCE EVALUATIONS ARE DEFINITIVE

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STATE	#x	ARMY	#x	NAVY	x	AIR	#x	FBI		AEC					

Note: Washington distribution indicated by "X"; Field distribution by "#".)

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REPORT [redacted]

[redacted]

COUNTRY Czechoslovakia

SUBJECT Continuous Casting and Rolling Process for Steel Production

DATE OF INFORMA[redacted]

PLACE ACQUIRED [redacted]

DATE DISTR. 31 DECEMBER 1958

NO. OF PAGES 6

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REFERENCES: [redacted]

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THIS IS UNEVALUATED INFORMATION

[redacted]

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Continuous Casting and Rolling Process for Steel Production

General Information

The idea for a continuous casting and rolling process for steel production, for development at the Welding Research Institute in Bratislava, came from engineer Dr. Joseph Cabelka, who was a welding authority, the director of the Institute, and a vice-director of the Czechoslovak Academy of Science. Dr. Cabelka started working on this idea in 1956. He was assisted by a Dr. Visner (fnu), a specialist in rolling-mill equipment, who designed the equipment for this particular process [redacted] 50X1-HUM

Actual construction of the continuous casting and rolling machine began at the beginning of 1957 [redacted] 50X1-HUM the project was approximately 85 percent completed. [redacted] 50X1-HUM practically all of the equipment for this process was made at the Welding Research Institute and that welding was used quite extensively in the construction. This equipment was being constructed to operate as a pilot-plant. The whole process was still in the experimental stage with certain steps theorized on paper only. There was no way of knowing how the process would work until it had actually been tried.

Identification Data

Figure 1 on page 6 is an overlay [redacted] 50X1-HUM Scale 1:25,000, Bratislava. Numbers in parentheses below refer to corresponding numbers on the overlay. 50X1-HUM

(1) Double Rail Line - standard European gauge, running from Bratislava to Zilina (N 48-13, E 18-44).

(2) Highway - four lanes divided by a streetcar line. It was about 16 meters wide, cobblestone, and in very good condition from Bratislava to Raca (N 48-13, E 17-09). Inside Bratislava the highway became Ulica Februarskeho Vitazstva Street.

(3) Single Rail Line - Standard European gauge, running between Bratislava and Galant (N 48-12, E 17-43).

(4) Chocolate Manufacturing Plant "Stollwerck" - a state enterprise.

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(5) Welding Research Institute - covering an area of about 900 x 250 meters.

Legend For Enclosure 1

3. Enclosure 1 is a sketch of the continuous casting and rolling machine. Numbers in parentheses below refer to corresponding numbers on the sketch. 50X1-HUM

(1) Laddle.

(1a) Inert gas pressure system.

(2) Basin.

(3) Optical pyrometer.

(4) Cooling section.

(5) Water passages.

(6) Indicating pyrometer.

(7) Water control valves.

(8) Passageway for the hot metal.

(9) Grooved rolls.

(10) Guide roll.

(11) Metal strip.

(12) Guide mechanism.

(13) Back-up roll.

(14) Planetary working-roll.

(15) Planetary roll cage.

(16) Thickness control mechanism.

(17) Rolling table.

(18) Guide mechanism.

(19) Finishing roll.

(20) Thickness control mechanism.

(21) Rolling table.

(22) Cut-off shears.

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(23) Coiler control valve.

(24) Coiler.

(25) Table for sheared strip.

(26) Control panel.

(27) Gear box cooling line (water).

(28) Gear mechanism for planetary rolls.

(29) Synchronizing mechanism for planetary rolls.

(30, 30a, 30b) Motors, approximately 80 KW, for three sets of rolls.

(31) Motor rheostats.

(32) Oil pumping system.

(33) Gear box.

(34) Cross section of passageway, Point (8).

(35) Cross section of a cooling section, Point (4).

Continuous Casting and Rolling Process

5. Following is the flow of the steel through the casting and rolling process. All the points refer to Enclosure 1. The molten steel is poured from the laddle of about two-ton capacity, Point (1), into a basin, Point (2), out of which it flows into a passage-way, Point (8), where it begins to cool. In 1958, the Welding Institute had only two small induction furnaces of about 600 to 700 kilograms capacity each. It was estimated that this amount of metal would allow about 15 minutes of continuous pouring, after which it would take about 40 minutes to get more hot metal from the furnaces. [redacted] it had not been determined what effect the interrupted pouring would have on the process. 50X1-HUM

6. As the hot metal reaches a certain height in the basin, Point (2), it begins to flow out into the passage-way, Point (8). This passage-way continues through an unknown number of cooling sections, Point (4), where the molten steel begins to cool and solidify. These cooling sections are made of copper and have pipes, Point (5), running through them through which water flows, closely regulated by valves, Point (7), to give the desired rate of cooling to the hot steel. Each cooling section has its own pyrometer for indicating the temperature of the hot metal, Point (6). A cross-section of a cooling section is shown as B-B, Point (35). The flow of the steel from the basin into the cooling passage-way is supposed to move by gravity-flow; however, in case

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it does not flow freely, it will be assisted by a pressurized system of an unknown inert gas as shown in Point (1a). [redacted] 50X1-HUM
[redacted] the initial experiments with this process will be with a plain carbon steel of about 0.10 percent carbon. [redacted] plans to try the process with low-alloy steels, but what types of steel [redacted] 50X1-HUM
[redacted] 50X1-HUM

As the solidified metal emerges from the last cooling unit, it passes between two rotating grooved rolls, Point (9), which keep the metal strip moving. As the metal strip moves along it passes between other rolls, Point (10), in a curving direction. All of the above-mentioned rolls are water-cooled. At Point (12) the metal strip enters a mechanism consisting of two metal blocks about 0.4 meters long and water-cooled. This device guides the strip into the planetary rolls, Point (13). The planetary system consists of two rolls about 700 milimeters in diameter each. Around the circumference of these rolls are mounted in cages, Point (15), an unknown number of smaller rolls about 70 milimeters in diameter, Point (14). These small rolls are powered independently of the large rolls and rotate in an opposite direction from that of the large rolls. These rolls were synchronized so that the upper and lower rolls would make contact simultaneously with the metal strip in an exact perpendicular plane. These small rolls were supposed to deliver about 2400 "hammering blows" per minute. These rolls were cooled by water after they lost contact with the metal strip. Point (16) is a movable mechanism connected with the planetary rolls to regulate the final thickness of the metal strip. This mechanism was connected with another mechanism which regulated the width of the passage-way, Point (8), through the cooling section so that there was a definite relationship between the width and thickness of the metal strip as it passed through the whole process. Point (34) shows a cross section of the passage-way, Point (8). The maximum width of the strip could be 350 milimeters, the minimum thickness could be one milimeter.

As the strip left the planetary system, it moved along a table of rotating rolls, Point (17) and through another set of smooth rolls, Point (19), of about 500 milimeters in diameter, to impart a smooth finish to the strip. From there it could be sheared, Point (22), to required lengths or coiled on a rotating spindle, Point (24). Point (26) is the control panel for the whole process. An oil pumping system, Point (32), lubricated the rolling equipment at various places with a fine spray of oil. Point (33) is the gear box for driving the three sets of rolls, Points (13, 14 and 19). [redacted] 50X1-HUM

[redacted] Comment [redacted]

1. The sketch of this process is not to scale. [redacted]

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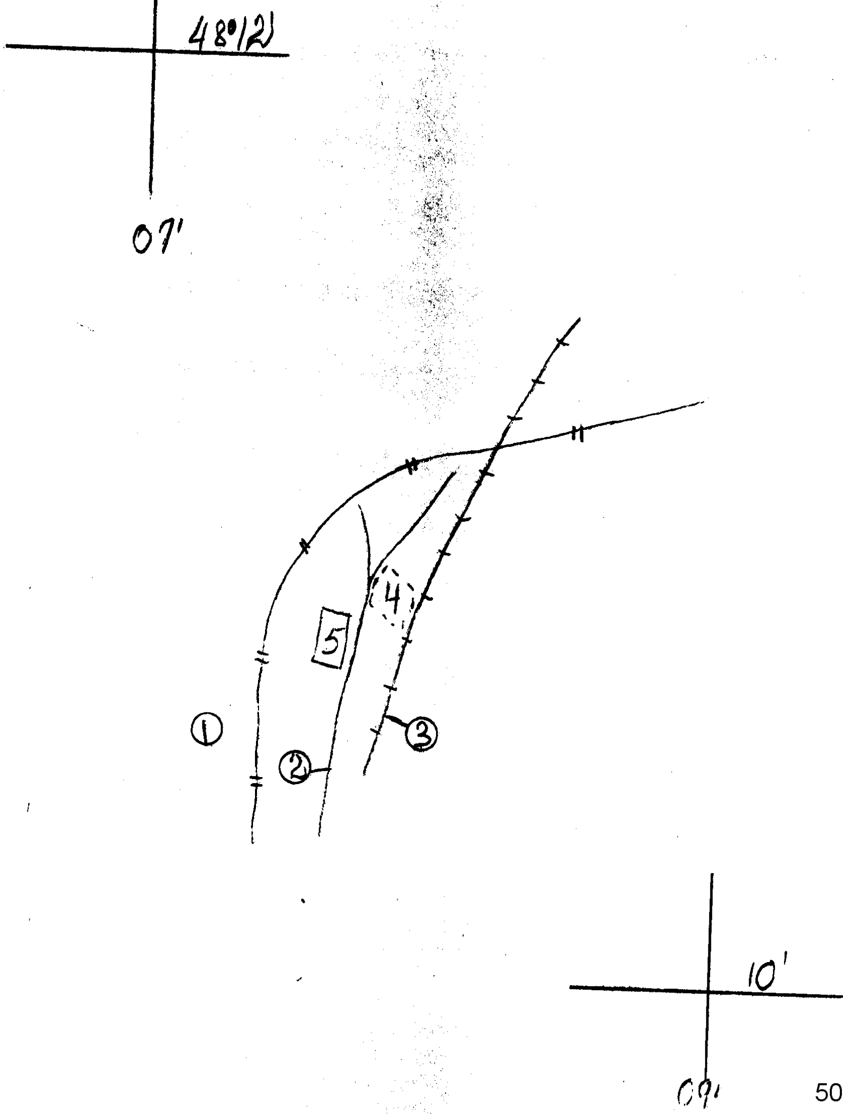
FIGURE 1. [redacted]
[redacted] Bratislava



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Enclosure:
[redacted] sketch of the continuous casting and rolling machine.

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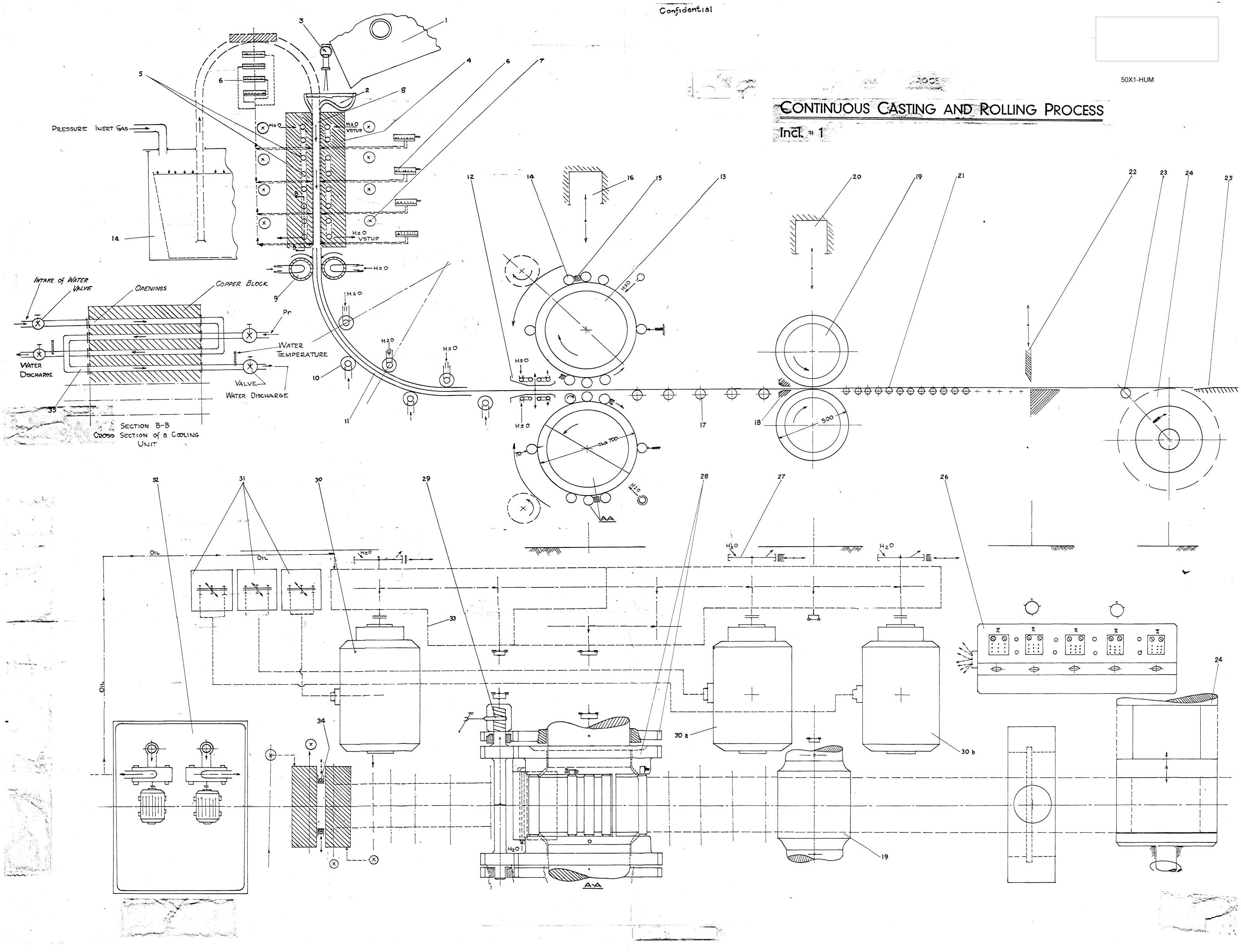
CONTINUOUS CASTING AND ROLLING PROCESS

Incl. # 1



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